APPENDIX A: Board Resolution 00-2

State of California
AIR RESOURCES BOARD

Resolution 00-2

February 24, 2000

Agenda Item No.: 00-1-2

WHEREAS, sections 39600 and 39601 of the Health and Safety Code authorize the Air Resources Board (the Board) to adopt standards, rules, and regulations and to do such acts as may be necessary for the proper execution of the powers and duties granted to and imposed upon the Board by law;

WHEREAS, in section 43000 of the Health and Safety Code, the Legislature has declared that the emission of air pollutants from motor vehicles is the primary cause of air pollution in many parts of the state and, in sections 39002 and 39003 of the Health and Safety Code, has charged the Board with the responsibility of systematically addressing the serious air pollution problem caused by motor vehicles;

WHEREAS, sections 43013, 43101, and 43104 of the Health and Safety Code authorize the Board to adopt motor vehicle emission standards, in-use performance standards, and test procedures, which it finds to be necessary, cost-effective, and technologically feasible;

WHEREAS, section 43018 of the Health and Safety Code directs the Board to endeavor to achieve the maximum degree of emission reduction possible from vehicular sources to accomplish the attainment of state ambient air quality standards by the earliest practicable date;

WHEREAS, section 43806 of the Health and Safety Code directs the Board to adopt emission standards and procedures applicable to new engines used in publicly owned and privately owned public transit buses;

WHEREAS, the United States Environmental Protection Agency has promulgated emission standards and programs to reduce emissions from urban transit buses, and those standards and programs can be found in Title 40 of the Code of Federal Regulations, Part 86;

WHEREAS, section 43701(b) of the Health and Safety Code requires the Board to adopt regulations that require heavy-duty diesel vehicles to utilize emission control equipment and alternative fuels to reduce emissions to the greatest extent feasible;

WHEREAS, on August 27, 1998, following extensive scientific review and public hearings, and consistent with the conclusions of the Scientific Review Panel and the Office of Environmental Health Hazard Assessment, the Board formally identified particulate emissions from diesel-fueled engines as a toxic air contaminant;

WHEREAS, the Board, through the adoption of Resolution 98-49 on September 24, 1998, called on state, local, and federal agencies to join together to "clean the fleet," supported immediate and continuing efforts to replace diesel-fueled school and public urban transit buses with low-emission alternative-fuel buses, including the provision of necessary infrastructure and technical training, and directed the staff to distribute this resolution to multiple affected parties;

WHEREAS, section 39667 of the Health and Safety Code directs the Board to achieve the maximum possible reduction in public exposure to toxic air contaminants by establishing emission standards for vehicular sources including new and in-use motor vehicles and fuels;

WHEREAS, the California Environmental Quality Act and Board regulations require that no project which may have significant adverse environmental impacts be adopted as originally proposed if feasible alternatives or mitigation measures are available to reduce or eliminate such impacts;

WHEREAS, the Board has considered the impact of this proposed regulatory action on the economy of the state;

WHEREAS, the ARB staff conducted public workshops on October 18, 1999, and on October 20, 1999, as well as numerous public outreach meetings, in order to include affected stakeholders in the public process for regulatory development;

WHEREAS, a staff report and draft regulatory language were published and made available to the public for 45 days prior to this Board hearing;

WHEREAS, a public hearing and other administrative proceedings have been held in accordance with the provisions of Chapter 3.5 (commencing with section 11340), Part 1, Division 3, Title 2 of the Government Code;

WHEREAS, based on the information in the public record, including the staff report and written and oral testimony, the Board finds that:

1. Diesel urban transit buses, on a per bus basis, contribute relatively high emissions of oxides of nitrogen (NOx) and particulate matter and operate in the most heavily congested urban areas where air quality is critical and direct exposure to diesel particulates occurs for large numbers of people.

2. Diesel urban transit buses are ideally suited for improved controls to reduce emissions because: 1) they are centrally-fueled, with known, fixed routes, which

allows for a low-emission, alternative fuel to be used more efficiently, 2) the entire cost of a new bus is not borne by local transit agencies as the purchase price of a new urban transit bus, including a low-emission, alternative-fuel bus, is heavily subsidized by the federal government, and 3) cost-effective emission reductions can be immediately achieved as low-emission, alternative-fuel engine technology is already available.

3. Public transportation provides important societal benefits by providing access to work and education, reducing traffic congestion, and meeting the mobility needs of the public, including the elderly and disabled.

4. Significant improvements in heavy-duty vehicle technology and the availability of cleaner alternative and conventional fuels allow the ARB and California's transit agencies to be partners in achieving new air quality benefits from public transportation.

5. It is necessary and appropriate to encourage transit agencies to voluntarily replace diesel-fueled urban transit buses with low-emission, alternative-fuel urban transit buses as a clean air strategy to meet health-based air quality standards for ozone and particulate matter, and as a way to reduce public exposure to toxic diesel particulate emissions.

6. It is necessary and appropriate that, based on expected advances in engine technology and new aftertreatment technologies, the proposed regulation establish more stringent emission standards for engines used in urban transit buses, applicable to heavy-duty engine manufacturers, beginning with the 2004 model year and again in the 2007 model year, in order to reduce emissions and public exposure to toxic air contaminants.

7. It is necessary and appropriate that the proposed regulation provide transit agencies the maximum flexibility commensurate with reducing emissions of criteria and toxic pollutants in determining their optimal fleet mix by allowing such agencies to choose between two compliance paths, either the diesel path or the alternative-fuel path.

8. It is necessary and appropriate that the proposed urban transit bus fleet rule use a combination of strategies to reduce emissions from both new urban buses and in-use urban buses in order to ensure low-emission public transportation in California in the most cost-effective manner feasible.

9. It is necessary and appropriate in order to reduce emissions, based on currently available engine and aftertreatment technologies and expected advancements in these technologies, that the proposed urban transit bus fleet rule include: 1) an in-use NOx fleet average requirement to encourage the retirement of 1987 and earlier model year diesel urban buses; 2) retrofit requirements to reduce public exposure to toxic diesel particulate emissions; 3) a low-sulfur diesel fuel

requirement; 4) more stringent emission standards affecting new urban transit bus purchases beginning with the 2004 model year and again in the 2007 model year; 5) a zero-emission bus demonstration project, beginning in 2003, for large transit agencies on the diesel path; and 6) zero-emission bus purchase requirements for large transit agencies on both the diesel and alternative-fuel paths.

10. It is appropriate to provide for alternative strategies for achieving greater emission reductions than those to be achieved by the 2004 emissions standards for diesel and dual-fuel bus engines, and that prior to approval of the first exemption for a transit agency on the diesel path from the requirements of section 1956.2(c)(4) of title 13, California Code of Regulations, the Executive Officer shall bring the application to the Board for consideration.

11. The regulation adopted herein will not cause California motor vehicle emission standards, in the aggregate, to be less protective of public health and welfare than applicable federal standards.

12. Separate California emission standards and test procedures are necessary to meet compelling and extraordinary conditions.

13. The California emission standards and test procedures as adopted herein will not cause the California requirements to be inconsistent with section 202(a) of the Clean Air Act and raise no new issues affecting previous waiver determinations of the Administrator of the Environmental Protection Agency pursuant to section 209(b) of the Clean Air Act.

WHEREAS, the Board finds that the adoption of the regulation approved herein will not have a significant adverse environmental impact and that the regulation is projected to have a positive air quality impact; and

WHEREAS, the Board further finds that no alternative considered by the Board would be more effective in carrying out the purpose for which the regulation is proposed or would be as effective and less burdensome to affected private persons.

NOW, THEREFORE, BE IT RESOLVED that the Board approves new sections 1956.1, 1956.2, 1956.3, and 1956.4 in title 13, California Code of Regulations, and approves amendments to section 1956.8 and to the heavy-duty test procedures incorporated by reference in section 1956.8, as set forth in Attachment A hereto.

BE IT FURTHER RESOLVED that the Board directs the Executive Officer to adopt the amendments, with the modifications approved by the Board as set forth in Attachment A hereto and such other conforming modifications as may be appropriate, after making the modified regulatory language available for public comment for a period of 15 days, provided that the Executive Officer shall consider such written comments as may be submitted during this period, shall make further modifications as may be appropriate in

light of the comments received or as necessary to ensure consistency with the modifications approved by the Board, and shall present the regulation to the Board for further consideration if he determines that this is warranted.

BE IT FURTHER RESOLVED that the Board directs the Executive Officer to work with transit agencies during implementation of the regulations, including the provisions of the fleet rule, and to report back to the Board regularly on transit agencies' progress in implementing the regulations.

BE IT FURTHER RESOLVED that the Board hereby directs the Executive Officer to encourage transportation planning agencies to provide more funding for transit agencies to fund the retrofit costs, infrastructure costs, and the portion of new bus purchase costs not covered by federal funds or incentive funds.

BE IT FURTHER RESOLVED that the Board directs the Executive Officer to work with transit agencies to identify potential sources of funding for the capital costs and infrastructure for future lower-emission bus technology.

BE IT FURTHER RESOLVED that the Board directs the Executive Officer to report back to the Board no later than January 2006 on the status of zero emission bus technology and the feasibility of implementing the zero-emission bus purchase requirement.

BE IT FURTHER RESOLVED that the Board directs the Executive Officer to report back to the Board on implementation of emission reduction strategies as an alternative to compliance with the 2004 standards, and the demonstration of advanced aftertreatment systems.

BE IT FURTHER RESOLVED that the Board directs the Executive Officer to evaluate the viability of test procedures to determine in-use emission compliance of urban transit buses.

BE IT FURTHER RESOLVED that the Board directs the Executive Officer to develop a test procedure for the evaluation of hybrid electric bus emissions and to report back to the Board by mid-2001.

BE IT FURTHER RESOLVED that the Board directs the Executive Officer to work with school districts, the Department of Education, engine manufacturers and bus manufacturers, the environmental community, and the public to further evaluate the potential health risk to school children exposed to particulate matter from diesel-fueled school buses, and also directs staff to report back to the Board on possible measures to reduce that exposure.

BE IT FURTHER RESOLVED that the Executive Officer shall, upon adoption, forward the regulation to the Environmental Protection Agency with a request for a waiver or confirmation that the regulations are within the scope of an existing waiver of federal preemption pursuant to section 209(b) of the Clean Air Act, as appropriate.

BE IT FURTHER RESOLVED that the Board directs the Executive Officer to work closely with the United States Environmental Protection Agency (U.S. EPA) in their development of a new national diesel fuel specification. It is this Board's intent that there be a national low sulfur diesel fuel standard in order to minimize price and supply disruptions in California. The Executive Officer shall revisit the low sulfur diesel fuel purchase requirement in this regulation as quickly as possible after the U.S. EPA adopts a new fuel specification. The Executive Officer shall return to the Board with a recommendation on whether harmonization with federal diesel fuel sulfur requirement is appropriate.

I hereby certify that the above is a true and correct copy of Resolution 00-2, as adopted by the Air Resources Board

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Pat Hutchens, Clerk of the Board

APPENDIX B: Transit Agencies by Fuel Path and Fleet Size

***(D): Diesel, (A): Alternative Fuel; AQMD: Air Quality Management District; APCD: Air Pollution Control District**

	Transit Agency	Fuel Path	Air District	Fleet Total (2001)	Fleet Total (2002)
1	Alameda/Contra Costa Transit District	D	Bay Area AQMD	741	751
2	Antelope Valley Transit Authority	D	Antelope Valley APCD	41	30
3	Arcata & Mad River Transit System	D	North Coast Unified AQMD	4	4
4	Central Contra Costa Transit Authority	D	Bay Area AQMD	132	128
5	Chico Area Transit System	D	Butte County AQMD	10	13
6	Chula Vista Transit	A	San Diego County APCD	25	35
7	Commerce Municipal Bus Lines	D	South Coast AQMD	13	13
8	Culver City	A	South Coast AQMD	43	45
9	Eastern Contra Costa Transit Authority	D	Bay Area AQMD	45	52
10	El Dorado County Transit Authority	D	El Dorado County	8	8
11	Eureka Transit Service	D	North Coast Unified AQMD	8	9
12	Fairfield/Suisun Transit	D	Bay Area AQMD	26	40
13	Folsom Stage Lines	D	Sacramento Metro AQMD	13	15
14	Foothill Transit	A	South Coast AQMD	Not submitted	Not submitted
15	Fresno Area Express	A	San Joaquin Valley APCD	117	117
16	Gardena Municipal Bus Lines	D	South Coast AQMD	50	51
17	Golden Empire Transit District	A	San Joaquin Valley APCD	78	78
18	Golden Gate Bridge Highway and Transportation District	D	Bay Area AQMD	273	277
19	Humboldt Transit Authority	D	North Coast Unified AQMD	10	11
20	Livermore/Amador Valley Transit Authority	D	Bay Area AQMD	67	71
21	Lodi	A	San Joaquin Valley APCD	5	6
22	Lompoc	D	Santa Barbara County APCD	2	2
23	Long Beach Transit	D	South Coast AQMD	192	192
24	Los Angeles County Metropolitan Transportation Authority	A	South Coast AQMD	2448	2411
25	Los Angeles Department of Transportation	A	South Coast AQMD	109	109
26	Mendocino Transit Authority	D	Mendocino County AQMD	9	9
27	Merced County Transit	D	San Joaquin Valley APCD	19	21
28	Metropolitan Transit Development Board	A	San Diego County APCD	92	106
29	Modesto	D	San Joaquin Valley APCD	40	52
30	Montebello Bus Lines	D	South Coast AQMD	78	78
31	Monterey-Salinas Transit	D	Monterey Bay Unified APCD	70	74
32	Napa VINE Transit Service	D	Bay Area AQMD	23	23
33	National City Transit	D	San Diego County APCD	12	16
34	North San Diego County Transit District	A	San Diego County APCD	149	149
35	Norwalk	D	South Coast AQMD	24	28
36	Omnitrans	A	South Coast AQMD	189	209
37	Orange County Transportation Authority	A	South Coast AQMD	506	543
38	Redding Area Bus Authority	D	Shasta County AQMD	18	18

	Transit Agency	Fuel Path	Air District	Fleet Total (2001)	Fleet Total (2002)
39	Riverside Transit Agency	A	South Coast AQMD	83	94
40	Roseville	D	Placer County APCD	7	20
41	Sacramento Regional Transit District	A	Sacramento Metro AQMD	214	214
42	San Diego County Transit System	A	San Diego County APCD	51	44
43	San Diego Transit	A	San Diego County APCD	318	321
44	San Francisco Municipal Railway	D	Bay Area AQMD	445	546
45	San Joaquin Regional Transit District	D	San Joaquin Valley APCD	71	83
46	San Luis Obispo	D	San Luis Obispo County APCD	15	12
47	San Luis Obispo Regional Transit Authority	D	San Luis Obispo County APCD	Not submitted	Not submitted
48	San Mateo County Transit District	D	Bay Area AQMD	306	353
49	Santa Barbara Metropolitan Transit District	D	Santa Barbara County APCD	53	53
50	Santa Clara Valley Transportation Authority	D	Bay Area AQMD	528	574
51	Santa Clarita Transit	D	South Coast AQMD	60	60
52	Santa Cruz Metropolitan Transit District	A	Monterey Bay Unified APCD	99	110
53	Santa Maria Area Transit	D	Santa Barbara County APCD	8	8
54	Santa Monica's Big Blue Bus	A	South Coast AQMD	179	199
55	Santa Rosa CityBus	D	Bay Area AQMD	25	25
56	Simi Valley Transit	A	South Coast AQMD	9	11
57	Siskiyou County STAGE	D	Siskiyou County APCD	3	3
58	Sonoma County Transit	A	Bay Area AQMD	49	60
59	South Coast Area Transit	D	Ventura County APCD	43	43
60	Stanislaus Regional Transit	A	San Joaquin Valley APCD	4	6
61	SunLine Transit Agency	A	South Coast AQMD	38	38
62	Thousand Oaks	A	South Coast AQMD	5	7
63	Torrance Transit System	D	South Coast AQMD	50	50
64	Union City Transit	A	Bay Area AQMD	12	14
65	Unitrans	A	Yolo-Solano AQMD	34	34
66	Vallejo Transit	D	Bay Area AQMD	54	27
67	Victor Valley Transit Authority	A	Mohave Desert AQMD	21	19
68	Visalia City Coach	D	San Joaquin Valley APCD	21	24
69	Western Contra Costa Transit Authority	D	Bay Area AQMD	19	19
70	Yolobus	A	Yolo-Solano AQMD	32	47
			TOTAL	8545	8912

APPENDIX C: Transit Agencies by NOx Emission Fleet Average

***(D): Diesel, (A): Alternative Fuel; AQMD: Air Quality Management District; APCD: Air Pollution Control District**

	Transit Agency	Path	Air District	NOx Average (2001)	NOx Average (2002)
1	Alameda/Contra Costa Transit District	D	Bay Area AQMD	5.14	4.43
2	Antelope Valley Transit Authority	D	Antelope Valley APCD	5.20	4.80
3	Arcata & Mad River Transit System	D	North Coast Unified AQMD	7.50	5.63
4	Central Contra Costa Transit Authority	D	Bay Area AQMD	5.80	4.48
5	Chico Area Transit System	D	Butte County AQMD	6.40	4.62
6	Chula Vista Transit	A	San Diego County APCD	7.72	3.24
7	Commerce Municipal Bus Lines	D	South Coast AQMD	6.54	4.69
8	Culver City	A	South Coast AQMD	5.58	3.78
9	Eastern Contra Costa Transit Authority	D	Bay Area AQMD	5.33	4.15
10	El Dorado County Transit Authority	D	El Dorado County	4.75	4.75
11	Eureka Transit Service	D	North Coast Unified AQMD	5.38	4.33
12	Fairfield/Suisun Transit	D	Bay Area AQMD	6.35	6.24
13	Folsom Stage Lines	D	Sacramento Metro AQMD	4.92	4.47
14	Foothill Transit	A	South Coast AQMD	Not submitted	Not submitted
15	Fresno Area Express	A	San Joaquin Valley APCD	4.68	4.68
16	Gardena Municipal Bus Lines	D	South Coast AQMD	5.28	4.67
17	Golden Empire Transit District	A	San Joaquin Valley APCD	5.26	4.01
18	Golden Gate Bridge Highway and Transportation District	D	Bay Area AQMD	5.27	4.95
19	Humboldt Transit Authority	D	North Coast Unified AQMD	4.80	4.18
20	Livermore/Amador Valley Transit Authority	D	Bay A rea AQMD	5.07	4.68
21	Lodi	A	San Joaquin Valley APCD	2.50	2.75
22	Lompoc	D	Santa Barbara County APCD	2.50	2.50
23	Long Beach Transit	D	South Coast AQMD	4.86	4.58
24	Los Angeles County Metropolitan Transportation Authority	A	South Coast AQMD	4.97	4.33
25	Los Angeles Department of Transportation	A	South Coast AQMD	6.72	6.72
26	Mendocino Transit Authority	D	Mendocino County AQMD	4.00	4.00
27	Merced County Transit	D	San Joaquin Valley APCD	4.47	4.00
28	Metropolitan Transit Development Board	A	San Diego County APCD	3.24	3.14
29	Modesto	D	San Joaquin Valley APCD	6.68	4.69
30	Montebello Bus Lines	D	South Coast AQMD	5.49	4.54
31	Monterey-Salinas Transit	D	Monterey Bay Unified APCD	6.38	5.28
32	Napa VINE Transit Service	D	Bay Area AQMD	5.78	5.26
33	National City Transit	D	San Diego County APCD	7.75	4.00

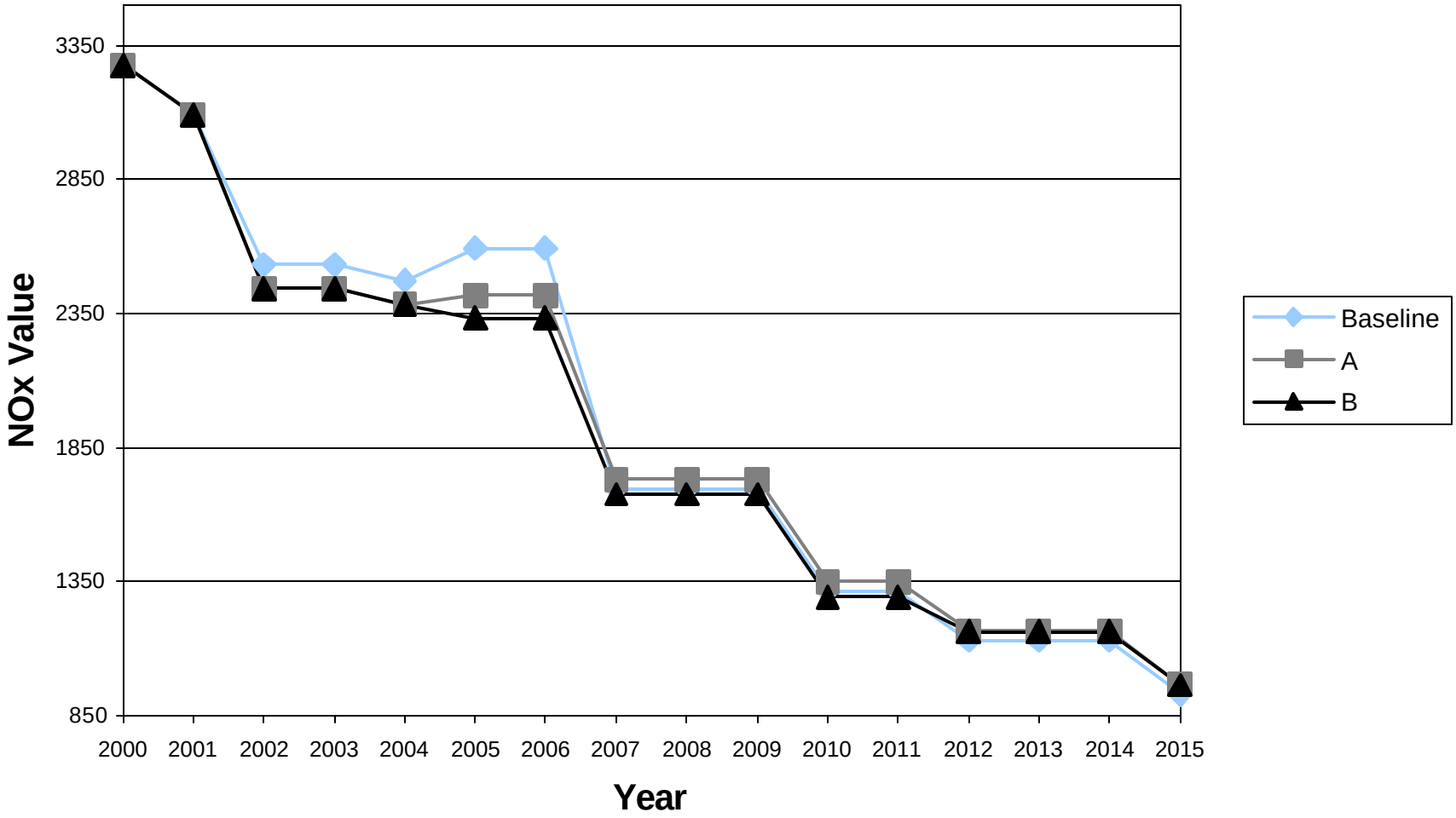
	Transit Agency	Path	Air District	NOx Average (2001)	NOx Average (2002)
34	North County Transit District	A	San Diego County APCD	4.48	4.48
35	Norwalk	D	South Coast AQMD	4.50	3.79
36	Omnitrans	A	South Coast AQMD	4.74	3.80
37	Orange County Transportation Authority	A	South Coast AQMD	5.92	4.10
38	Redding Area Bus Authority	D	Shasta County AQMD	5.22	5.22
39	Riverside Transit Agency	A	South Coast AQMD	6.04	2.50
40	Roseville	D	Placer County APCD	5.71	3.93
41	Sacramento Regional Transit District	A	Sacramento Metro AQMD	4.32	4.32
42	San Diego County Transit System	A	San Diego County APCD	7.67	4.25
43	San Diego Transit	A	San Diego County APCD	5.14	4.17
44	San Francisco Municipal Railway	D	Bay Area AQMD	5.68	4.57
45	San Joaquin Regional Transit District	D	San Joaquin Valley APCD	4.58	4.64
46	San Luis Obispo	D	San Luis Obispo County APCD	6.73	4.42
47	San Luis Obispo Regional Transit Authority	D	San Luis Obispo County APCD	Not submitted	Not submitted
48	San Mateo County Transit District	D	Bay Area AQMD	5.33	4.71
49	Santa Barbara Metropolitan Transit District	D	Santa Barbara County APCD	6.26	5.00
50	Santa Clara Valley Transportation Authority	D	Bay Area AQMD	6.28	4.38
51	Santa Clarita Transit	D	South Coast AQMD	4.63	4.27
52	Santa Cruz Metropolitan Transit District	A	Monterey Bay Unified APCD	6.28	4.20
53	Santa Maria Area Transit	D	Santa Barbara County APCD	3.78	3.78
54	Santa Monica Big Blue Bus	A	South Coast AQMD	5.75	4.78
55	Santa Rosa CityBus	D	Bay Area AQMD	5.12	5.12
56	Simi Valley Transit	A	South Coast AQMD	5.11	3.14
57	Siskiyou County STAGE	D	Siskiyou County APCD	4.00	4.00
58	Sonoma County Transit	A	Bay Area AQMD	5.36	4.65
59	South Coast Area Transit	D	Ventura County APCD	3.62	3.27
60	Stanislaus Regional Transit	A	San Joaquin Valley APCD	4.38	2.50
61	SunLine Transit Agency	A	South Coast AQMD	3.58	3.32
62	Thousand Oaks	A	South Coast AQMD	3.20	3.14
63	Torrance Transit System	D	South Coast AQMD	4.88	4.88
64	Union City Transit	A	Bay Area AQMD	4.25	4.00
65	Unitrans	A	Yolo-Solano AQMD	4.25	4.25
66	Vallejo Transit	D	Bay Area AQMD	6.61	4.70
67	Victor Valley Transit Authority	A	Mohave Desert AQMD	2.73	2.79
68	Visalia City Coach	D	San Joaquin Valley APCD	5.71	5.09
69	Western Contra Costa Transit Authority	D	Bay Area AQMD	4.00	4.00
70	Yolobus	A	Yolo-Solano AQMD	6.38	5.62

APPENDIX D: Alternative NOx Strategy Exemption Applications

AQMD: Air Quality Management District
APCD: Air Pollution Control District

	Agency	Fuel Path	Air District	Submitted Plan	Submitted Demo	Details of Plans
1	Alameda/Contra Costa Transit District	D	Bay Area AQMD	**Y**	N	Replacement of old engine with repowering, purchase of new engines
2	Central Contra Costa Transit Authority	D	Bay Area AQMD	N	N	
3	Eastern Contra Costa Transit Authority	D	Bay Area AQMD	N	N	
4	Golden Gate Bridge Highway and Transportation District	D	Bay Area AQMD	**Y**	N	1) 6 express bus expansion, no repower after 2003 2) 6 express bus expansion & repower 63 MY 1991 TMC coaches
5	Livermore/Amador Valley Transit Authority	D	Bay Area AQMD	N	N	
6	San Francisco Municipal Railway	D	Bay Area AQMD	N	N	
7	Santa Clara Valley Transporation Authority	D	Bay Area AQMD	**Y**	N	1) repowering of '92 buses 2) repower '92 buses, purchase of 14 expansion buses; 3) repower '92 buses & purchase 14 expansion buses to replace other buses in fleet; 4) purchase of fuel cell buses
8	El Dorado County Transit Authority	D	El Dorado County APCD	N	N	
9	Monterey-Salinas Transit	D	Monterey Bay Unified APCD	N	N	
10	Merced County Transit	D	San Joaquin Valley APCD	N	N	Asked for one year delay on submitting exemption application information
11	Visalia City Coach	D	San Joaquin Valley APCD	N	N	
12	Long Beach	D	South Coast AQMD	N	N	
13	Montebello	D	South Coast AQMD	N	N	Incomplete plan – did not provide baseline plan or project out to 2015
14	Norwalk	D	South Coast AQMD	N	N	
15	San Joaquin Regional Transit	D	San Joaquin Valley APCD	N	N	

APPENDIX E: VTA NOx Emission Benefits Comparison (Baseline, Options A & B)



APPENDIX F: VTA Baseline Plan

02*: Post October 1, 2002

Bus Engine Model Year																																				
	84	**85**	**86**	**87**	**88**	**89**	**90**	**91**	**92**	**93**	**94**	**95**	**96**	**97**	**98**	**99**	**00**	**01**	**02**	**02***	**03**	**04**	**05**	**06**	**07**	**08**	**09**	**10**	**11**	**12**	**13**	**14**	**15**	**Fuel Cell**	**Fleet Total**	**NOx Value**
2000	50		93			55	33		91	54				86	47	15																			524	**3275**
2001	11		93			55	33		91	54				86	47	15		52																	537	**3093**
2002			9				33		91	54				86	47	15		52	180																567	**2533**
2003			9				33		91	54				86	47	15		52	180															3	570	**2533**
2004							14		91	54				86	47	15		52	180		58													3	600	**2474**
2005							14		91	54				86	47	45		52	180		58		14											3	644	**2601**
2006							14		91	54				86	47	45		52	180		58		14											3	644	**2601**
2007														86	47	15		52	180		58		14		159									3	614	**1704**
2008														86	47	15		52	180		58		14		159									3	614	**1704**
2009														86	47	15		52	180		58		14		159									3	614	**1704**
2010															33	15		52	180		58		14		159			85						18	614	**1321**
2011															33	15		52	180		58		14		159			85						18	614	**1321**
2012																		52	180		58		14		159			85		41				25	614	**1137**
2013																		52	180		58		14		159			85		41				25	614	**1137**
2014																		52	180		58		14		159			85		41				25	614	**1137**
2015																			180		58		14		159			85		41			44	33	614	**937.8**
Sum																																				**31212**

APPENDIX G: VTA Option A Plan

02*: Post October 1, 2002

	Bus Engine Model Year																																		
	84	**85**	**86**	**87**	**88**	**89**	**90**	**91**	**92**	**93**	**94**	**95**	**96**	**97**	**98**	**99**	**00**	**01**	**02**	**02***	**03**	**04**	**05**	**06**	**07**	**08**	**09**	**10**	**11**	**12**	**13**	**14**	**15**	**Fuel Cell**	**Fleet Total**	**NOx Value**
2000	50		93			55	33		91	54				86	47	15																			524	**3275**
2001	11		93			55	33		91	54				86	47	15		52																	537	**3093**
2002			9				33			54				86	47	15		52	271																567	**2442**
2003			9				33			54				86	47	15		52	271															3	570	**2442**
2004							14			54				86	47	15		52	271		58													3	600	**2383**
2005							14			54				86	47	15		52	271		58		14											3	614	**2418**
2006							14			54				86	47	15		52	271		58		14											3	614	**2418**
2007														86	47	15		52	180		58		14		159									3	614	**1732**
2008														86	47	15		52	180		58		14		159									3	614	**1732**
2009														86	47	15		52	180		58		14		159									3	614	**1732**
2010															33	15		52	180		58		14		159			85						18	614	**1349**
2011															33	15		52	180		58		14		159			85						18	614	**1349**
2012																		52	180		58		14		159			85		41				25	614	**1165**
2013																		52	180		58		14		159			85		41				25	614	**1165**
2014																		52	180		58		14		159			85		41				25	614	**1165**
2015																			180		58		14		159			85		41			44	33	614	**965.8**
Sum																																				**30825**

APPENDIX H: VTA Option B Plan

02*: Post October 1, 2002

Bus Engine Model Year																																			
	84	**85**	**86**	**87**	**88**	**89**	**90**	**91**	**92**	**93**	**94**	**95**	**96**	**97**	**98**	**99**	**00**	**01**	**02**	**02***	**03**	**04**	**05**	**06**	**07**	**08**	**09**	**10**	**11**	**12**	**13**	**14**	**15**	**FC**	**Total**	**Total**
2000	50		93			55	33		91	54				86	47	15																			524	**3275**
2001	11		93			55	33		91	54				86	47	15		52																	537	**3093**
2002			9				33			54				86	47	15		52	271																567	**2442**
2003			9				33			54				86	47	15		52	271															3	570	**2442**
2004							14			54				86	47	15		52	271		58													3	600	**2383**
2005										54				86	47	15		52	271		58		14											3	600	**2334**
2006										54				86	47	15		52	271		58		14											3	600	**2334**
2007														72	47	15		52	180		58		14		159									3	600	**1676**
2008														72	47	15		52	180		58		14		159									3	600	**1676**
2009														72	47	15		52	180		58		14		159									3	600	**1676**
2010															19	15		52	180		58		14		159			85						18	600	**1293**
2011															19	15		52	180		58		14		159			85						18	600	**1293**
2012																		52	180		58		14		159			85		29				23	600	**1163**
2013																		52	180		58		14		159			85		29				23	600	**1163**
2014																		52	180		58		14		159			85		29				23	600	**1163**
2015																			180		58		14		159			85		29			44	31	600	**963.4**
Sum																																				**30367**

APPENDIX I: Retrofit Device Verification Letters (Engelhard & Johnson Matthey)

Winston H. Hickox
Agency Secretary

Air Resources Board

Alan C. Lloyd, Ph.D.
Chairman
1001 I Street • P.O. Box 2815 • Sacramento, California 95812 • www.arb.ca.gov

Gray Davis
Governor

August 2, 2001

Mr. Kevin Hallstrom
Engelhard Corporation
101 Wood Avenue
Iselin, NJ 08830-0770

Dear Mr. Kevin Hallstrom:

The Air Resources Board (ARB) has reviewed your request for verification of your DPX catalyzed diesel particulate filter. Based on its evaluation of the data provided, ARB hereby verifies that the Engelhard DPX, with both the MEX and NEX catalyst formulations, reduces emissions of diesel particulate matter (PM) by 85 percent or greater for engines from the engine families in Table 1 in the applications listed in Table 2, for an emissions durability of 150,000 miles. The DPX is therefore approved as a Level 3 retrofit device for those engines and applications.

I. Table 1. Engine Families Verified for Use with the ECS

Engine Series	Engine Families
1995 Cummins M11 10.8 L	SCE661EJDATW, SCE661EJDASW
1996 Cummins M11 10.8 L	TCE661EJDATW, TCE661EJDARB
1997 Cummins M11 10.8 L	VCE661EJDATW, VCE661EJDARB
1998 Cummins ISM 10.8 L	WCEXH0661MAE, WCEXH0661MAD
1999 Cummins ISM 10.8 L	XCEXH0661MAI, XCEXH0661MAH
2000 Cummins ISM 10.8 L	YCEXH0661MAI, YCEXH0661MAH
2001 Cummins ISM 10.8 L	1CEXH0661MAR, 1CEXH0661MAQ

Table 2. Verified Applications of the ECS

Applications	
Refuse haulers	School buses
Fuel tanker trucks	Long haul trucks
Urban buses	Long haul buses

The aforementioned verification is valid provided the following operating criteria are met:

1. The engine must be operated with a fuel that contains a sulfur content of no more than 15 parts per million by weight.
2. The average engine exhaust temperature must be at least 225 degrees Celsius. Since there may be significant variations from application to application, Engelhard has indicated that it will review actual vehicle operating conditions (duty cycle, baseline emissions, exhaust temperature profiles, and engine backpressure) prior to retrofitting a vehicle with the DPX to ensure compatibility.
3. The engine should be well maintained and not consume lubricating oil at a rate greater than that specified by the engine manufacturer.
4. Engelhard must install a backpressure monitor and indicator light on all vehicles retrofitted with a DPX.

The ARB estimates that the DPX will incur no discernible fuel economy penalty when used in a compatible application.

After reviewing the submitted data, the ARB does not find that the DPX filter system has an appreciable effect on overall emissions of oxides of nitrogen.

Thank you for participating in ARB's diesel retrofit verification program. Should you have any questions or comments, please contact Ms. Annette Hebert, Branch Chief, Heavy-Duty Diesel In-Use Strategies Branch, at (626) 575-6973.

Sincerely,

//s//

Michael P. Kenny
Executive Officer

Winston H. Hickox
Agency Secretary

Air Resources Board

Alan C. Lloyd, Ph.D.
Chairman
1001 I Street • P.O. Box 2815 • Sacramento, California 95812 • www.arb.ca.gov

Gray Davis
Governor

August 2, 2001

Mr. Marty Lassen
Johnson Matthey
434 Devon Park Drive
Wayne, PA 19087-1816

Dear Mr. Marty Lassen:

The Air Resources Board (ARB) has reviewed your request for verification of your Continuously Regenerating Technology (CRT) filter system. Based on its evaluation of the data provided, ARB hereby verifies that the Johnson Matthey CRT filter system reduces emissions of diesel particulate matter (PM) by 85 percent or greater (or to at most 0.01 grams per brake horsepower-hour) for engines from the engine families in Table 1 in the applications listed in Table 2, for an emissions durability of 150,000 miles. The CRT filter system is therefore a Level Three retrofit device for those engines and applications.

Table 1. Engine Families Verified for Use with the ECS.

Engine Series	Engine Family
1999 Detroit Diesel Corporation Series 50 Bus	XDDXH08.5FJN
2000 Detroit Diesel Corporation Series 50 Bus	YDDXH08.5FJN
1999 Detroit Diesel Corporation Series 50 Truck	SDDXH08.5EJL
1998 Detroit Diesel Corporation Series 60 12.7L	WDDXH12.7EGD

Table 2. Verified Applications of the ECS.

Applications	
Refuse haulers	School buses
Fuel tanker trucks	Long haul trucks
Urban buses	Long haul buses

The aforementioned verification is valid provided the following operating criteria are met:

1. The engine must be operated with a fuel that contains a sulfur content of no more than 15 parts per million by weight.
2. The engine exhaust temperature must be at least 270 degrees Celsius for 40 percent of the operating cycle.
3. The engine's exhaust must produce an oxides of nitrogen (NOx) to PM ratio of at least 8, with a preference for a NOx/PM ratio of 15 or higher.
4. The engine should be well maintained and not consume lubricating oil at a rate greater than that specified by the engine manufacturer.
5. Johnson Matthey must install a backpressure monitor and indicator light on all vehicles retrofitted with a CRT filter system.

Since there may be variation in driving conditions, we recommend review of actual vehicle operating conditions (actual duty cycle, baseline emissions, engine backpressure, exhaust temperature profiles, fuel consumption, and fuel sulfur), prior to retrofitting a vehicle(s) with the ECS, to ensure proper operation of the ECS.

The ARB estimates that the CRT filter system will incur no discernible fuel economy penalty when used in a compatible application.

After reviewing the submitted data, the ARB does not find that the CRT filter system has an appreciable effect on overall NOx emissions.

Thank you for participating in ARB's diesel retrofit verification program. Should you have any questions or comments, please contact Ms. Annette Hebert, Branch Chief, Heavy-Duty Diesel In-Use Strategies Branch, at (626) 575-6973.

Sincerely,

//s//

Michael P. Kenny
Executive Officer